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ABSTRACT

Suggestions offered in this manual may aid in the formation and maintenance of an environmental education program. It is designed to encourage the use of the outdoor classroom, to provide a means of assessing the appropriateness of a particular site for environmental education purposes, and to suggest how such a site may be maintained for continued use in an environmental education program. Criteria for the selection of sites are enumerated, considering uniqueness of potential use, feasibility of the site for a particular use, and the capabilities of withstanding the impacts of use. Also, criteria are included by which the effects of use on the site can be determined, involving site modifications necessary to lessen the effects of use and periodic upkeep. Several inventories are described and recommended in addition to a general site inventory: comfort and safety, educational value, and environmental education potential. Other charts note educational needs and techniques, the focus of environmental education, land needs, problems associated with the area, recommended density use, and effects of use. (BL)

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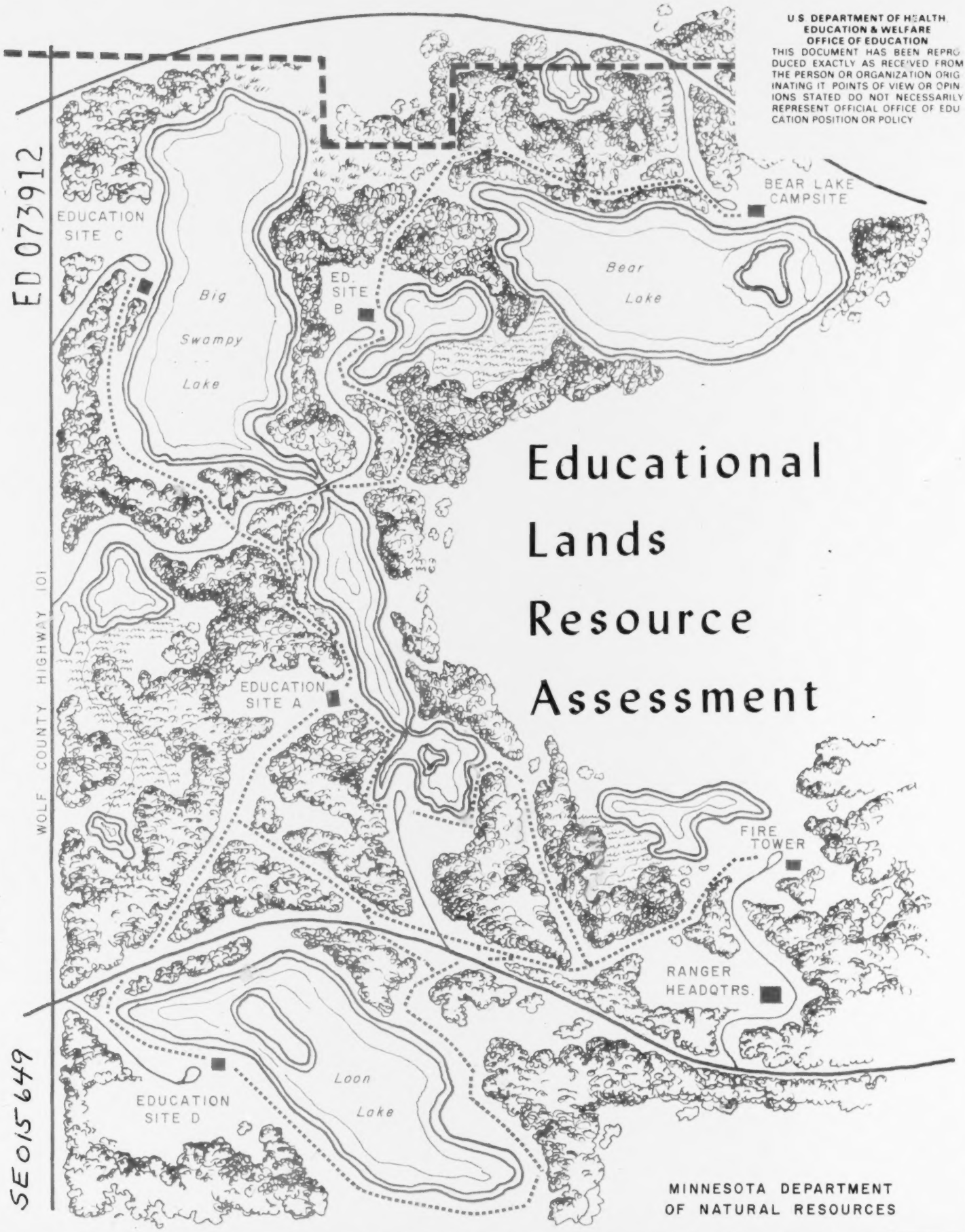

Educational Lands Resource Assessment

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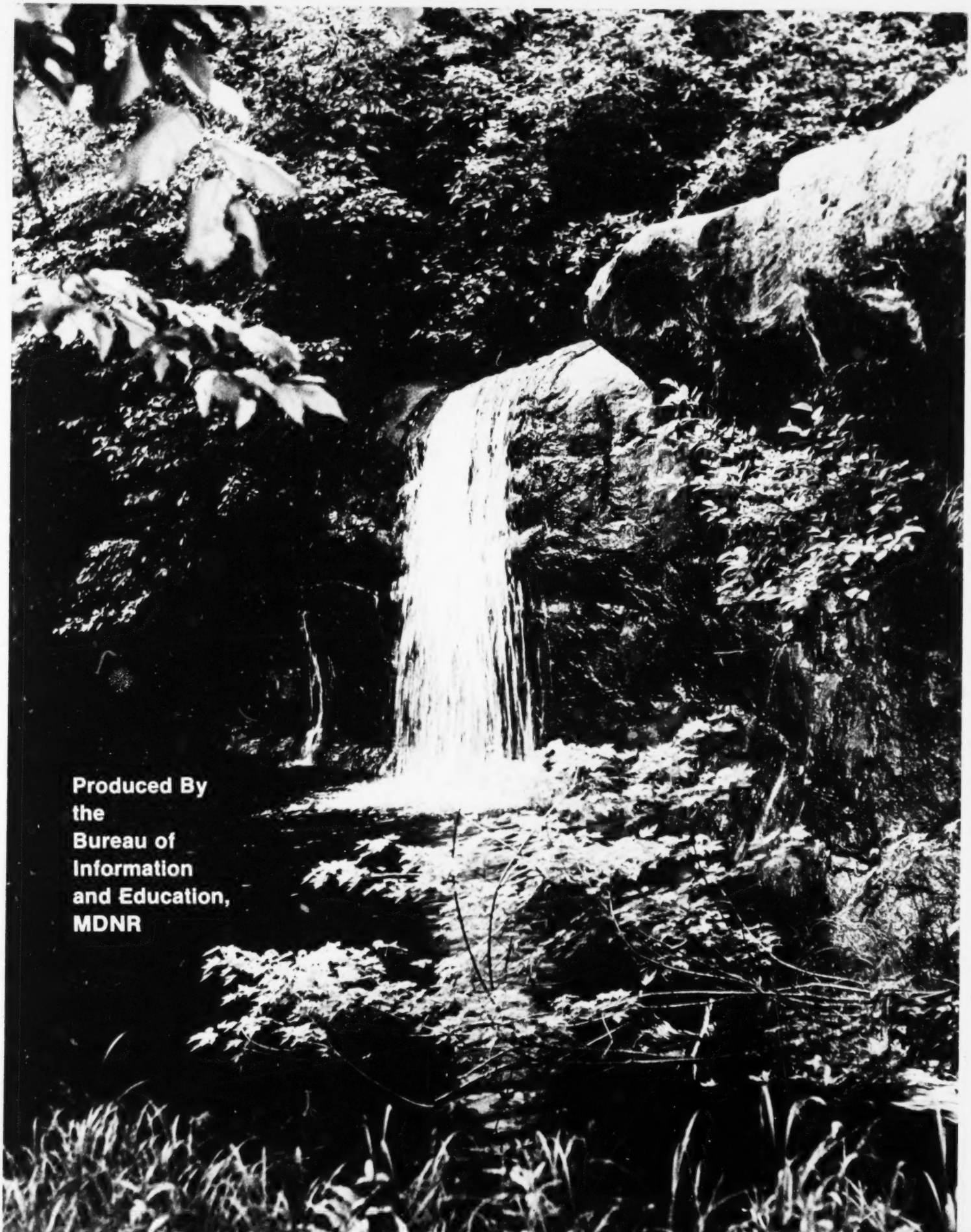

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Educational Lands Resource Assessment

by Karen Jostad

The Educational Lands Resource Assessment manual is an attempt to help teachers, students, and interested community members select, use, and maintain a site on public or private lands where they may conduct environmental education activities. As environmental education programs have expanded, efforts have been made to seek sites outside the classroom where these activities can take place. School properties are often poor for these purposes because they have been leveled and denuded of vegetation in the process of constructing buildings and facilities. Public land managers are encouraging schools to use public lands for education purposes, and some private owners will loan land for educational use. As yet, few schools have taken advantage of accessible public and private properties because either they are not aware the lands are available for educational purposes or they have no procedure for assessing the educational potential of a site.

The Educational Lands Resource Assessment is designed to aid in the formation and maintenance of an environmental education program developed and managed by teachers, students, and interested community members. State Natural Resource Managers and teachers are available to help instigate the Educational Lands Resource Assessment as they will the program itself, but the land and site assessment data collection and analysis is quite capable of being mastered by students with assistance from teachers and local residents who may be quite eager to join in.

Selection of educational sites should emphasize uniqueness of potential use, feasibility of the site for a particular use, and capability of withstanding the impacts of use. The Educational Lands Resource Assessment manual enumerates criteria for the selection of sites with these considerations in mind.

The use of the site should be planned and purposeful. Activities, investigations and involvements should be developed specifically for the site or should be adapted to the site from existing materials. Change and growth should be inherent in any environmental education program. The results of the Educational Lands Resource Assessment can be used as a basis for planning and activity development.

Site management involves site modifications necessary to lessen the effects of use (e.g. wood chip paths), and periodic upkeep combined with assessment of the effects of use. The Educational Lands Resource Assessment includes criteria by which the effects of use on the site can be determined.

Many individuals are available nearby who have the expertise to aid with an Educational Lands Re-

source Assessment. Of primary importance are people whose talents, time, and interest are available within the community. Seek them out. Their interest is necessary for a viable environmental education program. They may be willing to help financially as well as with their time and expertise. Involving community residents in such a project is an ideal way to create good will towards and interest in the public schools as well as take advantage of the deep knowledge some local residents have of the area.

The State Department of Natural Resources is an excellent source of aid for environmental education programs including the conduct of the Educational Lands Resource Assessment. Department of Natural Resources Managers and teachers in each geographic region are available to arrange practice assessment sessions for a number of interested teachers so that the teachers in turn can help the students work through one. Contact the Bureau of Information and Education, DNR, to learn their names and where they may be reached. If problems arise beyond their expertise they will be able to suggest others who may be better able to solve the difficulties.

The State Department of Education can recommend appropriate activity materials.

The Soil Conservation Service is an excellent source of information about the soil and topography in the vicinity; it may be able to supply specific data on sites tentatively selected, and may possibly have on hand some local resource directories they will send out. The Soil Conservation Service personnel are often quite willing to help educational groups.

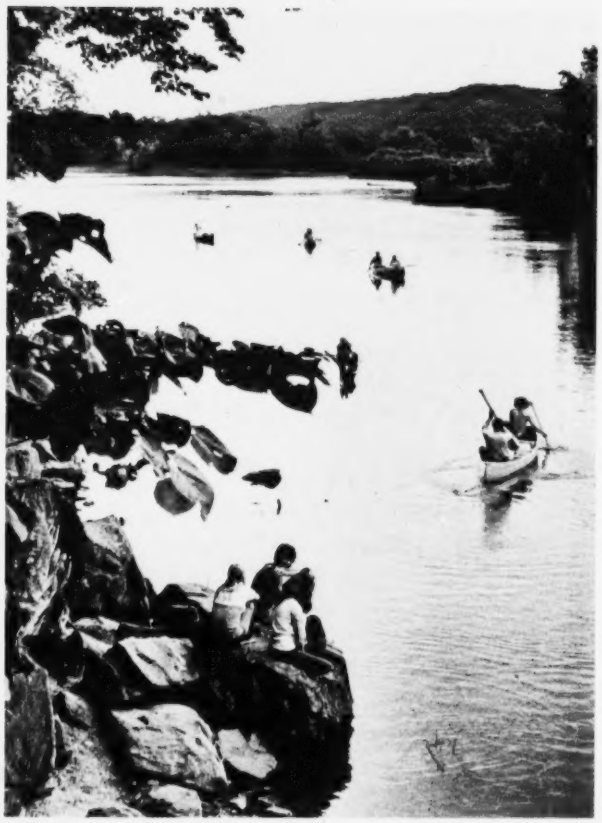
The Environmental Science Center at Golden Valley has demonstrated for several years its readiness to aid schools and communities with site development and community inventories.

The following volumes indicate local resources in comparison with state resources:

Atlas of Minnesota Resources and Settlement
Minnesota State Planning Agency
copies are available from:
Documents Section
140 Centennial Building
St. Paul, Minnesota 55155

Background Information for Framework Statewide Water and Related Land Resources Planning in Minnesota
copies are available from:
State Planning Agency
603 Capitol Square Building
St. Paul, Minnesota 55101

Natural Resource Planning Atlas of Minnesota
copies are available from:
Minnesota Department of Natural Resources
Division of Game and Fish
Centennial Building
St. Paul, Minnesota 55155



Selection of a Site

Outline Environmental Education Needs

The first prerequisite in the selection of a site is to determine the school's environmental education requirements and needs. Many schools have environmental education in some form. A questionnaire like the one below distributed to the teachers may help to assess present environmental education programs and activities.

Class Description _____

Which of the following most closely describes the focus of the environmental program in your classroom?

_____ Pollution or environmental degradation
_____ Ecology
_____ Man-land interrelationship
_____ Community studies (people and institutions)
_____ Nature appreciation

Which of the following most closely describes techniques you find most successful in teaching environmental education?

_____ Fact-giving
_____ Emotional appeal
_____ Selected experiences
_____ Problem solving
_____ Involvement in community environmental problems
_____ Investigation and data collection

Describe an environment education study site which would assist your present or future needs:

_____

_____

In order to select the most appropriate sites, it may be necessary for the school to formulate a coordinated environmental education program using the questionnaire data and information gathered from discussions with teachers. It may also be helpful to create a description of a site that would best suit the needs of most teachers who have an environmental education program. The data sheet below should aid in the compilation and analysis of information gathered describing environmental education needs. (See following table.)

Policy and facility restrictions may also affect the choice of a site suitable for an environmental education activity. Factors to be considered are time limitations for travel, busing, provision of food, securing of necessary approval from the central administration or school board, existing policy concerning field trips, and teacher liability.

Select Tentative Sites

Once the environmental education needs of the school have been outlined, tentative sites should be located. A Site-Selection Committee made up of interested teachers, students, and community residents can function to correlate the school's environmental education needs with the sites available. It would be the committee's task to approach land-holding agencies in order to determine their willingness to loan some part of their land for environmental education use.

Sites may be sought among a number of sources. In some cases, schools already own lands suitable for environmental education activities. Other sources are federal lands administered by the United States Forest Service, the Bureau of Land Management, the Corps of Engineers, the Bureau of Indian Affairs, and the Bureau of Sports, Fisheries and Wildlife; state lands, forests, parks, highways, institutional grounds, and lands administered by the Game and Fish division of the Department of Natural Resources; local lands include county-owned property and tax forfeited properties.

FOCUS OF ENVIRONMENTAL EDUCATION						EDUCATIONAL TECHNIQUE					
Class Description	Pollution or Environmental Degradation	Ecology	Man-Land Interrelationships	Community Studies	Nature Appreciation	Fact Giving	Emotional Appeal	Selected Experiences	Problem Solving	Involvement in Community Problems	Investigation and Data Collection
K-6 7-9											
Natural Science											
Physical Science											
Social Science											
Humanities											
Check if site would assist											

LAND NEEDS

General Category	Specifics from Respondents	No. of Respondents
wooded area		
stream		
pond		
topographical complexity	need area for contour mapping by vo-ed students	
meadows, grassland	would like native prairie grasses	
unique ecological features	beaver pond, heron nesting area, erosion	
sociological features	old cemeteries, 19th century architecture	

PROBLEMS

General Category	Specifics from Respondents
physical facilities	toilets, picnic tables
travel needs	must be within ½ hr. travel time
accessibility	accessible to handicapped students
familiarity	
safety	

Other sources include lands owned both privately and by businesses. Community organizations, speculators and real estate agents may be willing to loan a portion of their lands for environmental education purposes. If such lands are used, it is often wise to acknowledge the favor with a prominent sign posted on the site, such as "The _____ Chapter of the Masons have provided these lands for environmental education".

Managers of government lands are often anxious to promote the use of public lands for environmental education. In many cases they are willing to make some site modifications or provide shelters.

The selected tentative sites should be subjected to preliminary analyses (or inventories) by the Site-Selection Committee with the help of the Resource Manager if one is available. The preliminary analyses will determine the potential educational value of the sites and their potential for providing a safe and comfortable learning experience. The results of these inventories are recorded on paper maps by means of codes that will be transferred to maps printed on transparencies. When the transparencies are overlaid, they will indicate the most favorable site for the schools' environmental education activities.

The materials needed for the site inventories are:

Contour maps. The Natural Resources Manager may be able to provide them. If not, they can be obtained from a map supplier or ordered from the Geologic Survey. The *Index to Topographic Maps of Minnesota* contains the particular name and series number of any site. The maps are $.50 each and are ordered from:

Distribution Section
Geologic Survey
Federal Center
Denver, Colorado 80225

They can also supply a booklet entitled *Topographic Maps* that gives instruction on how to read topographic maps.

water-proof marking pens.

Overhead transparencies of the contour maps.

The section of the map showing the site should be cut out and reproduced in large quantities by students in graphic arts. If the site is small, blow it up to a useful size.

Each criterion to be mapped represents a different characteristic of a given site; for example, marsh. Only one criterion is recorded on each paper map and each transparency. Recording of the type of criteria on the map is limited to three designations; diagonals for unfavorable, dots for moderately favorable, and no color at all for very favorable. Collection of criterion data in the field should be made on the paper maps with water-proof marking pens.

The data is transferred to the transparent maps, using the same designations. When all are overlaid, the parts of the site that are most desirable for all the criteria recorded are the lightest. These transparencies can be used separately or together for different kinds of analysis and display.

First a master map indicating the site resources can be prepared and used as baseline data when interpreting the data collected in the inventories.

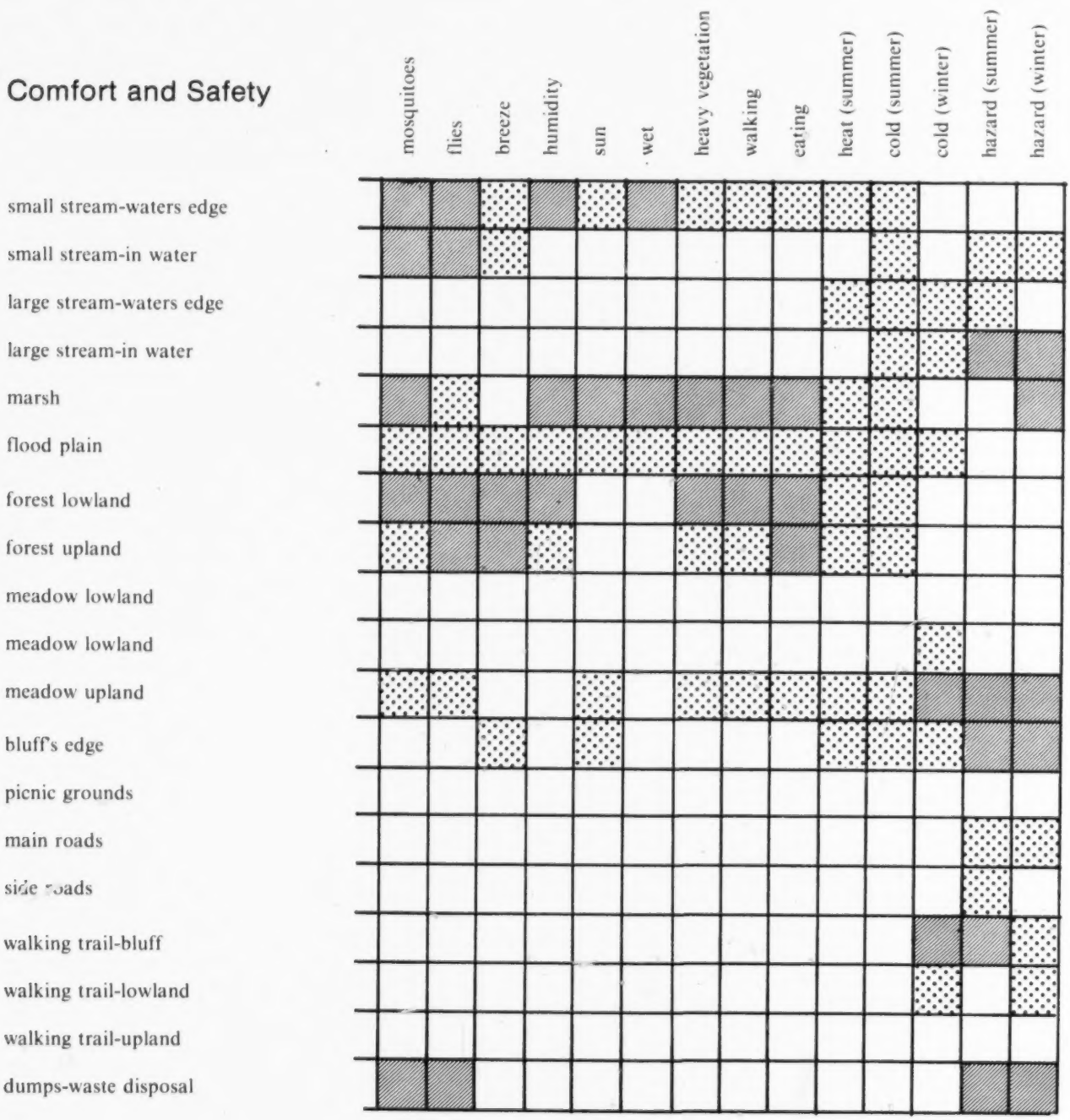
RESOURCES SUPERIMPOSED ON CONTOUR OR ROAD MAP

Ecological Boundaries		
Forest		Green
Meadow or Field		Green
Streams		Blue
Open Water		Blue
Flood Plain & Shoreland		Blue
Marsh		Blue
Rock		Red

Comfort and safety inventory

In order to realize the greatest learning potential from a site it is necessary to consider the prevalence of comfort and safety factors, in relation to the ages of the students, the kinds of activities they are to conduct and the amount of supervision to be provided. If the results of the suggested comfort and safety inventory indicate many hazards and annoyances, the learning potential may be cancelled out. In such a case the site can be eliminated or it could be somewhat modified. Following are some suggested criteria for determining the amount of comfort and safety.

Comfort and Safety



Preliminary Educational Value Inventory

To quickly assess the educational value of the sites, a preliminary mapping inventory using the kinds of criteria suggested below should be carried out. The criteria are not quantitative because the significance of various degrees of a characteristic is relative to a given area. For example, in the plains of southern Minnesota a slope of 25% might be of much more interest than it would be in northeastern or southeastern Minnesota. The most favorable vantage points for viewing would allow the student to view the entire site, and would be left without color on the map. There are both good and poor examples of typical transition zones to be found in any area, as there are both good and poor wildlife habitats. These should be appropriately coded on the maps.

Educational Value of the Study Site

Slope

Bedrock of Geologic Interest

Vantage points for viewing

Transition Zones

Wildlife Value

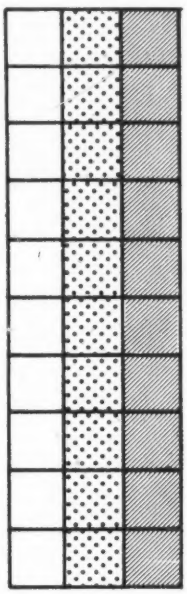
Unique Features

Plant Variety

Aquatics

Historic Value

Social Value



SITE USE AFTER SELECTION

Environmental Education Potential Inventory

After a site or several sites have been chosen, a comprehensive environmental education potential inventory should be conducted using the mapping procedure outlined earlier.

The following criteria are samples of these that help illuminate the environmental education potential of a particular site. They indicate some of the ecology, geology, social, historical, and topographical characteristics of a given area. Each characteristic is subsumed under a heading that represents a possible study focus. When the transparencies are completed and overlaid, the open spaces will indicate site areas where the study could be most favorably conducted. (See chart pp. 8-9.)

Initial site inventories can comprise the beginning of an accumulation of maps indicating the socio-ecological characteristics of a given site, that is all man-made and natural systems. The file will record the history of the use of the site for environmental education and the

changes in its ecological characteristics. If the site is very large, actual completion of the initial inventories may take several years; the collection can indicate what parts of the inventories have not been finished. If the site is smaller, site inventories should be taken annually and, in some cases, biannually. The file of inventory maps can be kept at the school or at the site headquarters if arrangements can be made.

When the initial inventories are complete, the site characteristics should be compared to the environmental education needs of the school. If the sites do not entirely meet the school's needs, a few may yet be unique enough to be valuable for some environmental education activities. The findings of both the needs assessment and the site inventories should be presented to teachers, students, and interested community residents by the Site-Selection Committee.

EDUCATIONAL POTENTIAL INVENTORY

Biological Diversity

	most diverse		least diverse
Tree types	mixed deciduous	mono deciduous	evergreen
Soil types	loam	sand	rock
Vegetative Class	marsh	wooded	open

Effect of Slope on Environment

	most obvious effect		least obvious effect
Slope	over 25%	10-25%	0-10%
Slope Facing	east or west	south	north
Slope Cover	bare	low vegetation	wooded

Agriculture Impacts

	most impact		least impact
Crops	row crops	mixed garden	hay fields
Farming Methods	contour, rotation	flat land, no special methods	hilly land, no special methods
Pastureage	Hill pastures	Open field pastures	Woods, pastures, flat land
Herd Density	5 animals/ acre	2 animals/ acre	1 animal/ acre

Drainage

Surface Waste	lakes, ponds, streams, marshes	saturated soil	no surface or soil water
Condition of Surface Water	heavily silted, muddy	opaque	clear
Land Conditions	eroded gullies	alluvial fans at base of hills, no deep gullies	no physical marks such as dry gullies
Soil Substance	sand & rock	silts and clay	bedrock

Land Surface

Surrounding Home Value	over $50,000	$25 to 50,000	less than $25,000
Surrounding Land Value	over $3.00/ ft.^{2}	$2.00-3.00/ ft.^{2}	less than $2.00/ ft.^{2}

Desirability for Use by non-educational interests

Unique Natural Values	no unique value	unique open areas	scenic beauty
Recreational Use	no value	picnicking, hunting, fishing, swimming	water skiing, snow-mobiles, trail bikes

Historical Content Valuable to Environmental Education

Land Use Artifacts and Evidence	old mines and quarries	worn out farmlands, cut over land	past residential area, no buildings, plantings, etc.
Cemeteries	Est. before 1900	Est. 1900 to 1930	Est. after 1930
Archaeological Sites	Being excavated by responsible group	Evidence on site	No evidence

Invertebrate Populations

Flying (2 sweeps with insect net)	☐ more than 10	▒ 5-10	☐ less than 5
Leaf Litter (one packed sandwich bag) (berlese funnel)	☐ more than 10	▒ 5-10	☐ less than 5

Pond Areas

Shoreline Vegetation	☐ dense deep	▒ intermittent	☐ very sparse
Eutrophication	☐ Old (nutrient rich)	▒ Middle Aged	☐ Young (clear, sterile)

Site Activities

Each site can be a locus for a number of activities adapted to it. Activity materials that can be adapted are available from a number of sources. Activities have been specifically designed so that they disrupt the natural environment as little as possible. Activity manuals can be procured from

State of Minnesota Department of Education
Capitol Square Building
St. Paul, Minnesota 55101
Request: Environmental Education Mini-Unit Series

Environmental Science Center
5400 Glenwood Avenue
Golden Valley, Minnesota 55422
Request: Lessons and Teacher Resources List

National Wildlife Federation
1412 - 16th St. NW
Washington, D.C. 20036
Request: Information about ordering the Environmental Discovery Series

Earth Space Science Curriculum Project
Box #1559
Boulder, Colorado 80302
Request: Environmental Studies Package I and II

Benefic Press Co.
10300 W. Roosevelt
Westchester, Illinois 60153
Request: Information about the Eco-Lab

Biological Sciences Curriculum Study
D. C. Health and Company
Boston, Mass.
Request: Laboratory Block-Ecology

Mine Publications Inc.
25 Groveland Terrace
Minneapolis, Minnesota 55403
Request: Environmental Studies Series

New York State College of Agriculture
Cornell University
Ithaca, New York
Request: Cornell Rural Schools Leaflets

These guides form a basic collection of curricula from which a program of environmental education studies for the site can be designed. A good adaptation of these activities to the site will help assure a continuing environmental education program. Additions to the existing activity texts should include information about the specific area in the site where a particular activity can be carried out most successfully, indications of problems students have had with the activity previously, time needed for travel, eating, and bathroom stops, suggestions for equipment to be built by students and sources of equipment already available, and resources to supplement the investigation. The activities should be kept in a central location so that all teachers, students and community members involved can have ready access to them. The program should be flexible so that new material can be introduced as it is discovered or designed.

Site Maintenance

Initial Site Modifications

Some modifications of the site may be necessary the first time the site is used. These may need to be repaired, replenished or replaced periodically. They are the responsibility of the students and teachers using the site. Site modifications should be minimal for both economical and ecological considerations. However, brush removal, shelter construction, driveway construction and repairs and other projects may be necessary. These modifications should be recorded so that inventories of past years will indicate the periodic operations that need to be carried out. Water sources and toilet facilities may be provided by the Natural Resource Manager; however, students should help with modifications or supply them completely whenever possible. For example, a lean-to shelter could very well be constructed by the senior-high carpentry class. The Natural Resource Manager can check the modification to see that it can be approved, and may possibly aid in its construction. Community organizations and residents such as retired carpenters, parents, housewives, and senior citizens may also be willing to help.

Managing for Continued Use

A Site Management Committee should be formed and might include the Natural Resource Manager in charge

of the area (if lands are publicly owned), interested community residents, students and teachers. The Committee should be responsible for continually assessing the effect of use on the site, revising the amount of use in order to alleviate harmful use effects and recommending and making plans for site modifications as the needs become apparent. For example, if paths are being worn in heavily used areas the Committee should investigate the need for surfacing the path or moving the activity. If the Committee decides to surface the path, they are responsible for locating a source of free wood chips and finding community residents and students willing to help install the path.

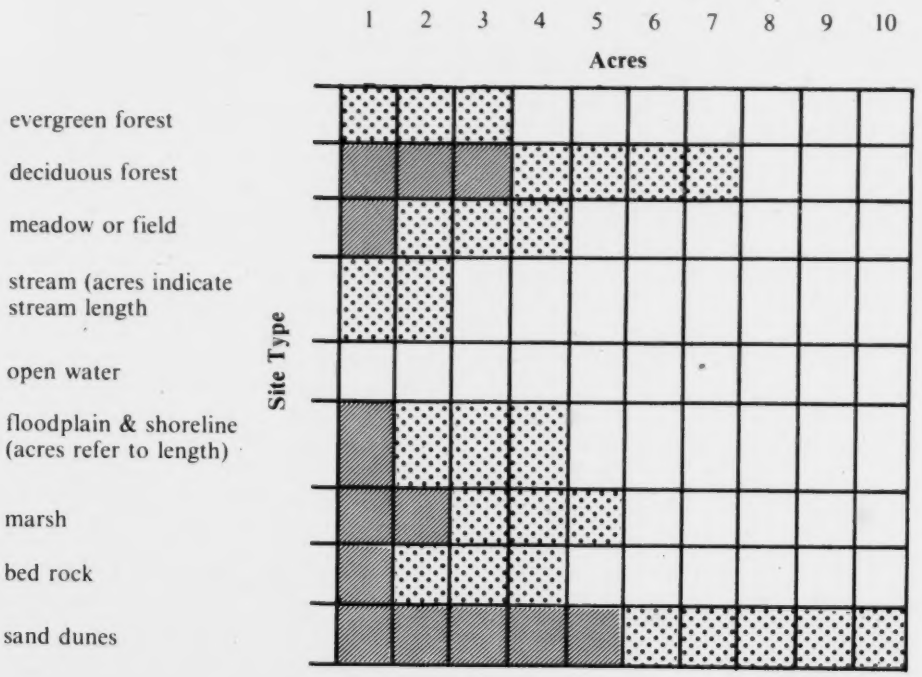
One of the Committee's most important responsibilities will involve the determination of the most feasible amount of use for the site and the construction of a use schedule from the information. The following chart will aid in determining the most feasible density of use for any given site.

RECOMMENDED DENSITIES

high density use; two classes of 30 students each at one week intervals

medium denisty use; one class of 30 students each at two week intervals

low density use; one class of 30 students each at one month intervals



The assumptions incorporated in the charts are (1) even distribution of students over the site to be used, (2) only moderately consumptive activities (only insects, plants and soil samples are collected, and only one of each type of those is taken. Students have definite standards to follow when collecting specimens.) (3) there are no restrictions on foot travel and no structures to reduce use effect caused by foot travel. If travel is restricted it may be possible to increase the density of use per acre.

It may be useful to construct a map of the site that shows the amount of use density each area can withstand. First indicate where on the map the different kinds of habitat occur. Estimate the acreage of each habitat area in order to judge the density of use it can tolerate, then code that area accordingly. Areas can withstand a greater use density if sections within it are used in rotation. For instance, if a four-acre site can tolerate 30 students, use only two acres but increase the density to 20 instead of 15. Next time, use the other two acres.

A use schedule can be constructed from the information given by the chart and knowledge of class size, periods of use, and consumptiveness of the activity.

Recording Effects of Use

Each group that uses the site for a study should be required to fill out an impact card at the conclusion of activity, and to file it with the site management Committee. This allows the Committee to constantly monitor the impact of use on the site. A sample card is illustrated. Note: "Taylor Slough" and "Prairie" are only examples. Prepare your own descriptions to fit the site.

IMPACT CARD

Date _____ Study Group _____

Location of Study:

NE Oak Woodlot _____ Taylor Slough _____

SW Oak Woodlot _____ Prairie _____

Noted Impact or Damage:

Paths starting to form _____ Description _____

_____

Damage to Vegetation _____ Description ____

_____

Vandalism _____ Description _____

_____

Litter _____ Description _____

_____

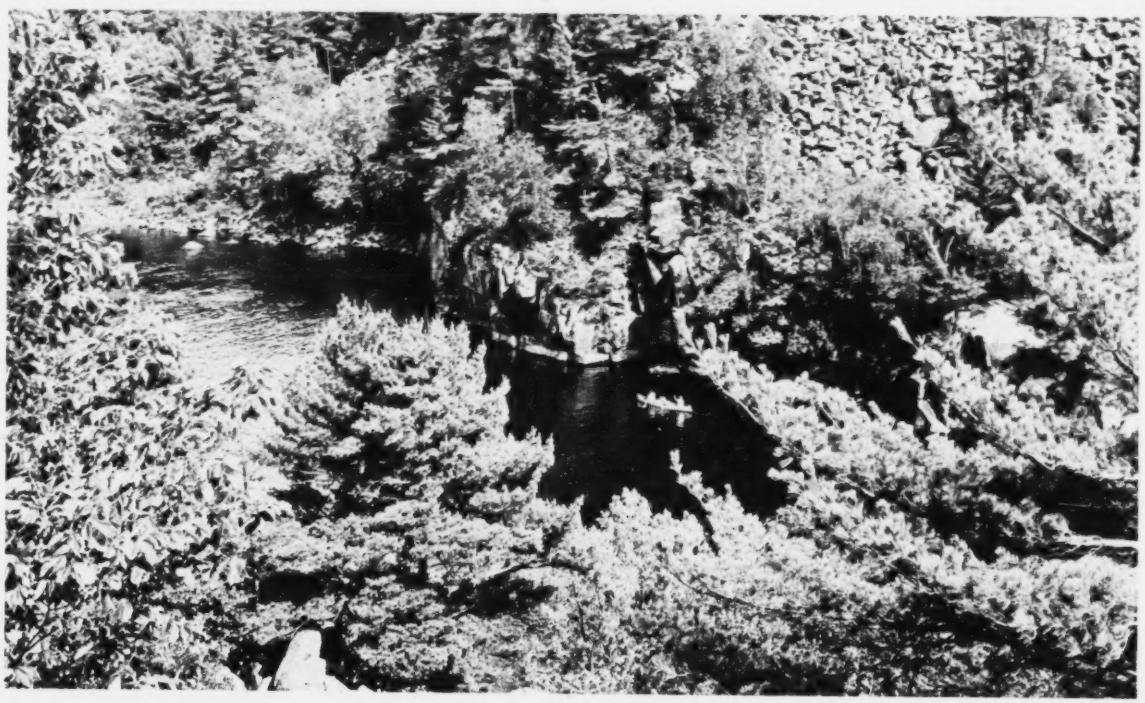
Other _____

_____

Suggested remedies for the damage? _____

_____

(return card to Site Management Committee)



In addition to the impact cards, the entire group might compile an accumulative record of a year's use of each study area in the site using the impact cards of data. The impact record sheet below is an example of how the effect of use can be rated on an ordinal scale over a year's time. (See chart p. 23)

The criteria listed are only suggestions. Criteria specific to a particular site should be developed by the Site-Management Committee.

Criteria to be assessed are listed and rated on a scale from 0 to 3. The numbers represent relative condition from, for example, poor (0) to excellent (3), or extinct species (0) to abundant species (3). The average of each of the criteria and a final overall average indicates whether the site condition is improving, staying the same or deteriorating. Management decisions can be made accordingly.

If problems of abuse of the situation arise, a committee of students, teachers, community members might prepare some regulations governing activity at the site to be discussed and passed on by the entire student body. Some sample regulations follow.

1. Insects are the only animals to be collected.
2. No soil samples may be taken without clearance from the Site Management Committee.
3. Plants may be collected when necessary for interpretation of data, but only one representative may be taken. If only a few of a particular plant are exist in the area, they may not be collected.
4. Students doing aquatic investigations must wear life perservers.

Conclusion

The value of public and private lands as educational resources is becoming increasingly apparent. This manual is designed to encourage the use of the outdoor classroom, to provide a means of assessing the appropriateness of a particular site for environmental education purposes, and to suggest how such a site may be maintained for continued use in an environmental education program. By means of such programs, an appreciation for and wise use of natural resources will continue to grow while learning experiences will become more exciting and challenging.

Site Condition - Effects of Year's Use

Site Study Area _____ Year _____

(Note: Your chart should contain all 12 months)

Rate each category for each month (0) — poor (3) — excellent	September	December	April	August	Average
Access Road					
Shelter					
Erosion					
Unique Species					
Ground Cover Vegetation					
Bushes					
Trees					
Artifacts					
Drainage					
Average					
Action Taken 0-1 site closed 2 examine site 3 none					Total Average for Year

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